PUBLIC REVIEW DRAFT – REDLINE VERSION

RFCA Attachment 5 Proposed Modification

Revision Key:

- ✓ Text proposed for deletion is lined through (e.g., ~~deleted text~~).
- ✓ New text is shown in bold, (e.g., **bold**).
- ✓ Where entire section, figure or table is proposed for deletion it has been removed, rather than lined through, for simplicity.
- ✓ Pagination does not match original.

1.0 GENERAL BACKGROUND

1.1 Goal of Action Levels and Standards Framework

During negotiations that resulted in the Final Rocky Flats Cleanup Agreement (RFCA), a working group consisting of the Department of Energy (DOE), the Environmental Protection Agency (EPA), the Colorado Department of Public Health and Environment (CDPHE), and Kaiser-Hill teams was formed to develop a consensus proposal for the appropriate cleanup standards **for surface water** and action levels **for all media** that should apply to the Rocky Flats Environmental Technology Site (RFETS **or Site**). **The working group developed** this Action Levels and Standards Framework for Surface Water, Ground Water, and Soil (ALF) **as its** final recommendation **in 1996 and several modifications were subsequently proposed, approved and incorporated into ALF. ALF was** developed in a manner generally consistent with the Rocky Flats Vision (Vision) and Rocky Flats Cleanup Agreement (RFCA) Preamble Objectives. In some cases, the working group found it necessary to more precisely define aspects of the objectives so that applicability of action levels and required mitigating actions could be completely defined.

The goal of the ALF is to:

- provide a basis for future decision-making;
- define the common expectations of all parties; and
- incorporate land- and water-use controls into Site cleanup.

The Parties have determined that a National Wildlife Refuge is the reasonably anticipated future land use for the purpose of making cleanup decisions. This determination is based upon the assumption that a National Wildlife Refuge will be established in accordance with the Rocky Flats National Wildlife Refuge Act of 2001 (Refuge Act). This determination is also consistent with the RFCA Preamble and RFCA Vision land use assumptions. As a National Wildlife Refuge, the Parties assume that the Site will remain in federal ownership, and the surface will be managed as a

Refuge where possible. Residential use is not recognized as a reasonably anticipated future land use. However, the rural resident exposure scenario was evaluated for the purposes of establishing risk-based surface soil action levels for plutonium, americium and uranium. A rural resident exposure scenario was also used to calculate the annual radiation dose under unrestricted land use conditions in order to ensure that the risk-based action levels meet radiation control standards.

This **ALF establishes** action levels **for groundwater and soil, action levels and** cleanup **standards for surface water and** put-back levels **for soil**. Action levels are numeric levels that, when exceeded, trigger an **action determination** evaluation **in accordance with ALF Sections 2-5 and an appropriate accelerated response** action. **In some cases, concentrations of contaminants below action levels may also trigger an accelerated action (e.g., cleanup of soils contamination that is below soil action levels, but that may impact surface water quality).**

A standard is an enforceable narrative and/or numeric restriction established by regulation and applied so as to protect one or more existing or potential future uses. Within this framework, standards are associated with surface water use classifications and applied at points of compliance (POCs). **Surface water** standards are not being directly applied to ground water or soils**; instead, contaminated soils and groundwater are evaluated to determine whether they may adversely impact surface water quality.**

Put-back levels **apply to soils that contain contaminants at levels that do not trigger an accelerated action, but that are excavated incidental to the conduct of accelerated actions. Put-back levels also apply to soils that have been treated to remove contaminants to below action levels as provided in an accelerated action decision document. DOE is** allowed to **replace these soils** back into the ground **if the contaminant concentration does not exceed the action levels listed in Table 3. Soils may be replaced into the ground only in the same Operable Unit (OU), as identified in RFCA Attachment 1, *Operable Unit Consolidation Plan* table of Proposed OU's for consolidation, in which they originated. DOE may, with LRA approval after appropriate consultation, replace excavated soils with contaminant concentrations greater than the put-back levels. In such cases d**ecision factors to be considered include remedy effectiveness and protectiveness, **reasonably** anticipated future land uses, contaminant levels in surrounding soils, potential for contaminants to affect surface water quality, and costs. **Decisions resulting in soil put-back will be recorded in the appropriate closeout report.**

Action levels are risk-based and risk is considered additive when multiple **contaminants** are present. **Radiological and non-radiological effects** will be assessed independently on a project-specific basis using methodology that is protective of human health and the environment. The cumulative **radiological and non-radiological** effects will be assessed on a project-specific basis if the **concentrations** are near their respective action levels.

Following implementation of accelerated actions, final remedial/corrective action decisions, including final cleanup levels will be determined in a Corrective Action Decision/Record of Decision (CAD/ROD). The final remedial/corrective actions specified in a CAD/ROD may require additional work based on the final cleanup levels to ensure an adequate remedy.

1.2 Programmatic Assumptions

The working group developed this framework using the following inter-related programmatic or Site-Wide assumptions:

- The framework must be consistent with the Vision and RFCA Preamble;
- Implementation of the framework must protect human health and the environment; and
- Implementation of the framework must protect surface water uses and quality.

Institutional controls will be part of the final remedy as appropriate to ensure protection of human health and the environment. The need for, and extent of, specific institutional controls and other activities that have collectively become known as "long term stewardship" will be analyzed in the RCRA Facility Investigation-Remedial Investigation/Corrective Measures Study-Feasibility Study. These other activities include such things as monitoring, maintenance, information management, and remedy review. Appropriate requirements for institutional controls and other long-term stewardship activities will be described as part of the preferred alternative in the Proposed Plan. Such requirements will be contained in all final CAD/ROD(s), in any post-closure CHWA permit that may also be required and in any modified RFCA agreement, consistent with RFCA Paragraph 286.

While the selection of individual institutional controls is dependent upon the final remedy selected, and therefore cannot be known at this time, the following institutional controls will be used as appropriate to protect human health and the environment:

- **prohibition of construction and use of buildings in contaminated areas;**
- **prohibition on drilling wells for water use into contaminated groundwater, the use of contaminated groundwater and/or pumping groundwater that could adversely affect the remedy;**
- **restrictions on excavation in areas above subsurface contamination or intrusion into subsurface contamination;**
- **restrictions on activities that cause soil disturbance in areas with surface soil contamination; and**
- **other restrictions to protect engineered controls (such as covers, groundwater barriers and treatment cells) and monitoring systems.**

The anticipated extent of areas with institutional controls at closure is shown in Figure 1. The anticipated boundary of areas that will be subject to institutional controls depicted in Figure 1 is subject to modification based upon characterization, future response actions, the results of the comprehensive risk assessment, and the final remedial/corrective action decision in the final CAD/ROD. The Parties additionally presume that there will be no residential development at Rocky Flats.

Section 25-15-320, C.R.S., requires an environmental covenant under certain conditions. As of October 2002, the Parties have not reached agreement on the applicability of this statute to the federal government. Failing an agreed-upon resolution, each Party reserves its rights as provided in RFCA Part 18.

1.3 Action Prioritization and Implementation

Accelerated actions will be **supportive of the** Intermediate and Long-Term Site Conditions as discussed in the RFCA Preamble **and to the extent practicable, will contribute to the efficient performance of any anticipated long-term remedial actions**. Protection of all surface water uses with respect to fulfillment of the Intermediate and Long-Term Site Conditions will be the basis for making soil and ground water **accelerated action** decisions. **Accelerated a**ctions will **also** be designed to prevent adverse impacts to ecological resources and ground water consistent with the ALF. Because the ALF does not address the inherent value of ground water, any residual effects on ground water not addressed through this Framework will be addressed under a Natural Resources Damage Assessment (NRDA).

Response action decisions may be implemented by means of an accelerated action (Proposed Action Memorandum [PAM], Interim Measure/ Interim Remedial Action [IM/IRA], or RFCA Standard Operating Protocol [RSOP]) or addressed as necessary in the CAD/ROD for the affected area. Actions will be

developed in an integrated manner with other actions being taken and will be consistent with best management practices.

2.0 SURFACE WATER

2.1 Basis for Standards and Action Levels

Protection of surface water will be a basis for making soil and groundwater **accelerated response action decisions pursuant to ALF Sections 3-5**, so that at the completion of all cleanup activities, surface water leaving RFETS should be of sufficient quality to support all uses. The surface water standards this framework is designed to protect are found in the WQCC Regulation No. 31: Basic Standards and Methodologies for Surface Water (5 CCR 1002-3l) ("Basic Standards") and the site-specific water quality standards in the WQCC Regulation No. 38 (5 CCR 1002-38) ("Site-Specific Standards").

The Colorado Water Quality Control Commission (WQCC) determines water quality standards throughout Colorado. Local municipalities, including Westminster, Broomfield, Thornton, and Northglenn, have been and will be involved and consulted in surface water decisions, including recommendations to the WQCC.

- **Surface water exists in creeks and ponds on RFETS as well as immediately offsite. These surface waters are part of Segments 4a/4b and 5 of Big Dry Creek as follows:**
- **Segment 4a – Mainstem and all tributaries to Woman Creek and Walnut Creeks from the sources to Standley Lake and Great Western Reservoir, except for specific listings in Segments 4b and 5;**
- **Segment 4b – North and South Walnut Creek and Walnut Creek, from the outlet of Pond A-4 and B-5 to Indiana Street;**
- **Segment 5 – Mainstems of North and South Walnut Creek, including all tributaries, lakes, and reservoirs, from their sources to the outlets of Ponds A-4 and B-5, on Walnut Creek, and Pond C-2 on Woman Creek.**

See Figure 2, *Sketch of Stream Segments 4a, 4b, and 5.*

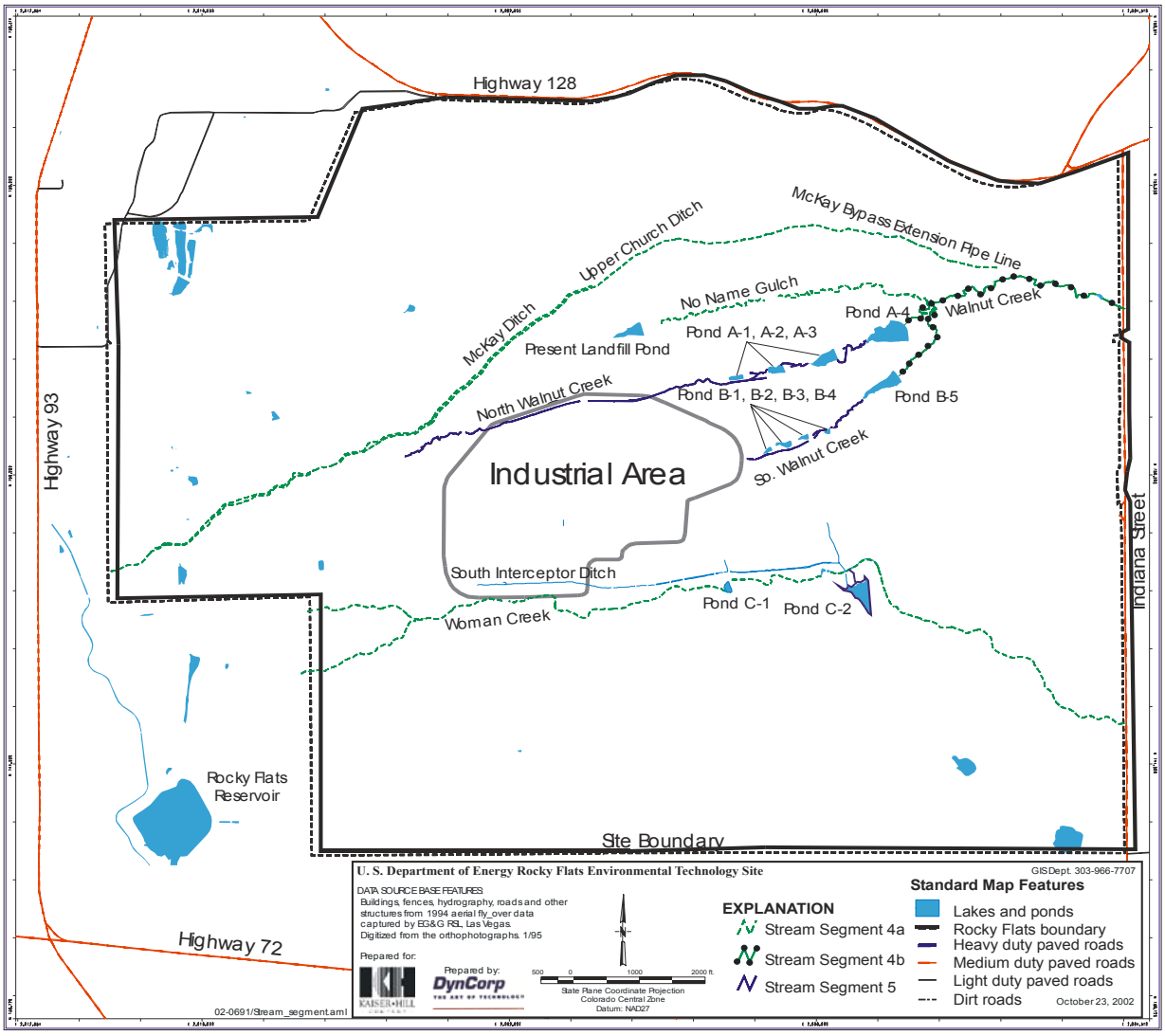

Figure 2. Sketch of Stream Segments 4a/4b and 5.

~~Surface water exists in Areas 2,3, and 4 on Figure 1, as well as immediately off-site. The standards, action levels, and POCs are based on the following refinement of land uses (assuming current pond water transfer configurations):~~

- ~~Area 2 (restricted open space) will include all surface water down to, and including, the terminal ponds (Ponds A-4 and B-5) in Walnut Creek. For Woman Creek, only Pond C-2 is in Area 2. Therefore, the surface water in Area 2 is consistent with Segment 5 of Big Dry Creek.~~

- ~~Areas 3 and 4 (unrestricted open space and restricted open space due to low levels of surficial plutonium contamination, respectively) will include the streams from the terminal ponds to the plant boundary in Walnut Creek and all of Woman Creek except Pond C-2. The surface water in Areas 3 and 4 is part of Segment 4a/4b of Big Dry Creek.~~

2.2 Numeric Levels During Active Remediation (Near-Term Site Condition)

During the period of active remediation, the Table 1 values will apply as standards in Segment 4a/4b of Big Dry Creek and as action levels in Segment 5.

A. Non-radionuclides

1. The numeric values that will apply throughout both stream segments are based on Colorado surface water use classifications consistent with the uses described in the RFCA Preamble:
   - Water Supply;
   - Aquatic Life - Warm 2;
   - Recreation 2; and
   - Agricultural.
2. Numeric values will be derived from the following:

   a. For metals, the site-specific standards or the basic standards apply, except where temporary modifications apply. If the basic and site-specific standards differ for a particular metal, the site-specific standard applies.
   b. For inorganics, the site-specific standards apply or the basic standards apply, except where temporary modifications apply. If the basic or site-specific standards differ for a particular inorganic, the site-specific standard applies.
   c. For organic chemicals, the more stringent of the basic standards or the site-specific standards applies, except where temporary modifications apply.
3. Effective March 2,1997, MCLs were adopted as temporary modifications for six organic compounds in Segment 5. These temporary modifications of surface water standards were granted through the year 2009 by the WQCC and must be re-examined every three years. Other temporary modifications to the numeric values during active remediation may be developed through subsequent working group efforts.

   a. The basis for proposing the temporary modifications may include one or more of the following:

- A determination of ambient conditions in a manner consistent with the Basic Standards (5 CCR 1002-3 1);
- A mass-balance equation that calculates maximum influent concentrations in Segment 5 that will be protective of numeric values at Segment 4a/4b POCs without allowing treatment within waters of the State; and
- Some other methodology agreed to by all Parties.

b. These temporary modifications should be developed together with other stakeholders (i.e., the local municipalities that are impacted by surface water from the RFETS).

4. Any contamination in surface water resulting from releases from a unit at RFETS subject to RCRA interim status requirements will be addressed through this ALF and through remedial actions rather than through RCRA closure (see Attachment 10 to RFCA, RCRA Closure for Interim Status Units). This would include surface water containing nitrates that has been impacted by the Solar Ponds ground water plume. Addressing the nitrates through this framework will allow these waters to be managed in a more cost-effective and flexible manner. The Parties recognize that changes in the management of nitrates may cause the surface water to more routinely approach the current 10 mg/L standard at the POC.

5. Due to detention and batch release operations of Pond A-4 and Pond B-5 waters, exceedance of the numerical pH of 9.00 occurs. Both the wastewater treatment plant effluent and storm water inflows to the ponds have pH values within the numerical range of 6.5 to 9.00 prior to detention in Pond B-5 and A-4; however, the nutrient loading to the ponds promotes algae growth which can shift carbonate equilibria. These conditions cause pH exceedance above 9.00 (with a calculated 85th percentile value of 9.10). All parties agree that aquatic use is likely not impacted by pH exceedances; however, the DOE will strive to control pH in the pond waters through prudent pond water management.

B. Radionuclides

1. Numeric values for plutonium and americium for Segments 4a/4b and 5 are risk-based (**1x**10 $^{-6}$ **lifetime excess cancer risk** from direct exposure including consumption). These values are the statewide basic standards, effective March 2, 1997, as set by the WQCC.

2. Both radionuclides will be analyzed separately, and compared to the numeric value below:
   - 0.15 pCi/L for plutonium and

- 0.15 pCi/L for americium.

There is no total pCi/L limit.

3. The Parties agree that in the event that the plutonium and americium numerical standards are exceeded, the DOE will make every effort to identify the source of the exceedance. This will include documenting: hydrologic characteristics; preventive actions, terminal pond operational parameters; and any abnormal conditions and occurrences. Further, specific decisions regarding the terminal pond operations and the release of water will be guided by the Pond Operations Plan. This plan includes specific responses for identified circumstances and preserves dam safety. DOE shall have the burden to demonstrate prudent pond water management and strive to maintain the lowest detained volume practicable in the terminal ponds.

4. In Segments 4a/4b and 5, numeric values for gross alpha, gross beta, tritium and uranium will be the site-specific standards found in Table 2 of 5 CCR 1002-8-38. Numeric values for radium and strontium are based on the statewide Basic Standards (5 CCR 1002-31.11). The Parties will re-examine these values based upon conditions in the basins and will propose alternative values if appropriate.

C. POCs/~~Action Level Measuring Points~~ **Points of Evaluation (POEs)**

1. In Segment 4a/4b, POCs will be placed at the existing sampling locations for the outfalls of the terminal ponds (Ponds A-4, B-5, and C-2) in both Walnut Creek and Woman Creek. Additional POCs for plutonium **and** americium ~~and tritium~~ will be established near where Indiana Street crosses Walnut and Woman Creeks. In the event that exceedances simultaneously occur for either plutonium **or** americium ~~or tritium~~ at both the Indiana Street POC and the associated Terminal Pond POC, then this occurrence will be treated as a single enforcement action. As conditions at the RFETS change, the locations of the POCs may need to change. Such changes can be made by agreement of the Parties pursuant to Part 9 of RFCA.

2. In Segment 5, exceedance of action levels will be measured ~~in the ponds~~ **at POEs** upstream in the main stream channel at existing gauging/sampling stations or at additional sampling locations in the main stream channel as necessary. **POEs will be identified in the Integrated Monitoring Plan. A POE in Segment 5 will be established below the v-notch weir following the Sewage Treatment Plant disinfection process. At the POE below the v-notch weir, plutonium, americium and**

uranium will be monitored. When Sewage Treatment Plant operations cease, this POE will be eliminated.

3. Compliance will be measured using a 30-day moving average for those contaminants for which this is appropriate. When necessary to protect a particular use, acute and chronic levels will be measured differently as described in the current Integrated Monitoring Plan.

4. **Compliance will be measured for plutonium and americium using an annual average at the existing POCs at the outfalls of the terminal ponds (Ponds A-4, B-5, and C-2) in both Walnut Creek and Woman Creek contingent upon WQCC adoption of an annual average period. CDPHE shall take action to obtain WQCC adoption of the annual average period. During active remediation, compliance will continue to be measured for plutonium and americium using a 30-day moving average at the existing POCs near where Indiana Street crosses Walnut and Woman Creeks.**

5. **Performance monitoring points are Segments 4a/4b and 5 in-stream locations identified in any accelerated action decision document and/or in any CAD/ROD where surface water is sampled to determine whether the concentration of any contaminant identified for sampling in the response action meets specified water quality objectives. Such performance monitoring may be incorporated into the Integrated Monitoring Plan after the response action is implemented.**

2.3 Numeric Levels After Active Remediation (Intermediate and Long-Term Site Conditions)

When the Intermediate Site Condition is achieved following completion of active remediation, the surface water must be of sufficient quality to support any surface water use classification in both Segments 4a/4b and 5. All final remedies must be designed to protect surface water for any use as measured at the nearest and/or most directly impacted surface water in Segments 4a/4b and 5. Interim remedies will be consistent with this as a goal. Any temporary modifications will be removed. POCs will be at the outfalls of the terminal ponds and near where Indiana Street crosses both Walnut and Woman Creeks. **Compliance will be measured for plutonium and americium using an annual average at the existing POCs at the outfalls of the terminal ponds (Ponds A-4, B-5, and C-2) in both Walnut Creek and Woman Creek. However, compliance will be measured for plutonium and americium using a 30-day moving average at the existing POCs near where Indiana Street crosses Walnut and Woman Creeks**. If the terminal ponds are removed, new monitoring and compliance

points will be designated and will consider ground water in stream alluvium. **The need for and location of POEs and performance monitoring points will be addressed as necessary in the CAD/ROD.**

2.4 Action Determinations

A. When contaminant concentrations exceed the Table 1 standards at a POC, source evaluation and mitigating action will be required. Specific remedial actions will be determined on a case-by-case basis, but must be designed such that surface water will meet applicable standards at the POCs. If standards are exceeded at a POC, DOE will inform the CDPHE and EPA of such exceedances within 15 days of gaining knowledge of the exceedances. In addition, DOE will, within 30 days of gaining knowledge of the exceedances, submit to CDPHE and EPA a plan and schedule for source evaluation for the exceedance, including a preliminary plan and schedule for mitigating action. Final plans and schedules for mitigating actions will be developed and implemented by DOE, in consultation with CDPHE and EPA, following completion of the source evaluation. Nothing in this paragraph, however, shall preclude DOE from undertaking timely mitigation once a source has been identified. Once an initial notification, source evaluation, and mitigating action have been triggered for a particular exceedance, additional exceedances from the same source would not require separate notifications or additional source evaluations or mitigation. The Standley Lake Protection Project (SLPP) Operations Agreement addresses conditions and timing of storage and releases of waters in the Woman Creek Reservoir. Consistent with the SLPP Operations Agreement, it is the intent of the Parties that waters which. meet the standards at the Indiana Street POC are acceptable for any use.

B. During active remediation, when contaminant concentrations in Segment 5 exceed the Table 1 action levels, source evaluation will be required. If mitigating action is appropriate, the specific actions will be determined on a case-by-case basis, but must be designed such that surface water will meet applicable standards at the POCs. In the case of action level exceedances in Segment 5, DOE will inform the CDPHE and EPA of such exceedances within 15 days of gaining knowledge of the exceedances. In addition, DOE will, within 30 days of gaining knowledge of the exceedances, submit to CDPHE and EPA a plan and schedule for source evaluation for the exceedance, including a preliminary plan and schedule for mitigating action. Final plans and schedules for mitigating actions will be developed and implemented by DOE, in consultation with CDPHE and EPA, following completion of the source evaluation. Nothing in this paragraph, however, shall preclude DOE from undertaking timely mitigation once a source has been identified. Once an initial notification, source evaluation, and mitigating

action (if appropriate) have been triggered for a particular exceedance, additional exceedances from the same source would not require separate notifications or additional source evaluations or mitigation.

C. Exceedances of water quality standards at a POC may be subject to civil penalties under sections 109 and 310(c) of CERCLA. In addition, failure of DOE to notify CDPHE and EPA of such exceedances, or to undertake source evaluations or mitigating actions as described in paragraph 2.4.A, above, shall be enforceable consistent with the terms of Part 16 of the RFCA.

D. Exceedances of action levels in Segment 5 shall not be subject to civil penalties. However, failure of DOE to notify CDPHE and EPA of such exceedances, or to undertake source evaluations or mitigating actions (if appropriate) as described in paragraph 2.4.B above, shall be enforceable consistent with the terms of Part 16 of the RFCA.

2.5 Surface Water Monitoring Network

A. Surface water monitoring will continue as currently established unless subsequent changes are agreed to by all Parties. Surface water monitoring will be consistent with the Integrated Monitoring Plan which will be reviewed and revised on an annual basis.

B. All parties will receive quarterly surface water monitoring reports which will highlight any exceedances of surface water standards or action levels and any significant changes to surface water flow conditions.

RFCA Attachment 5 Proposed Modification

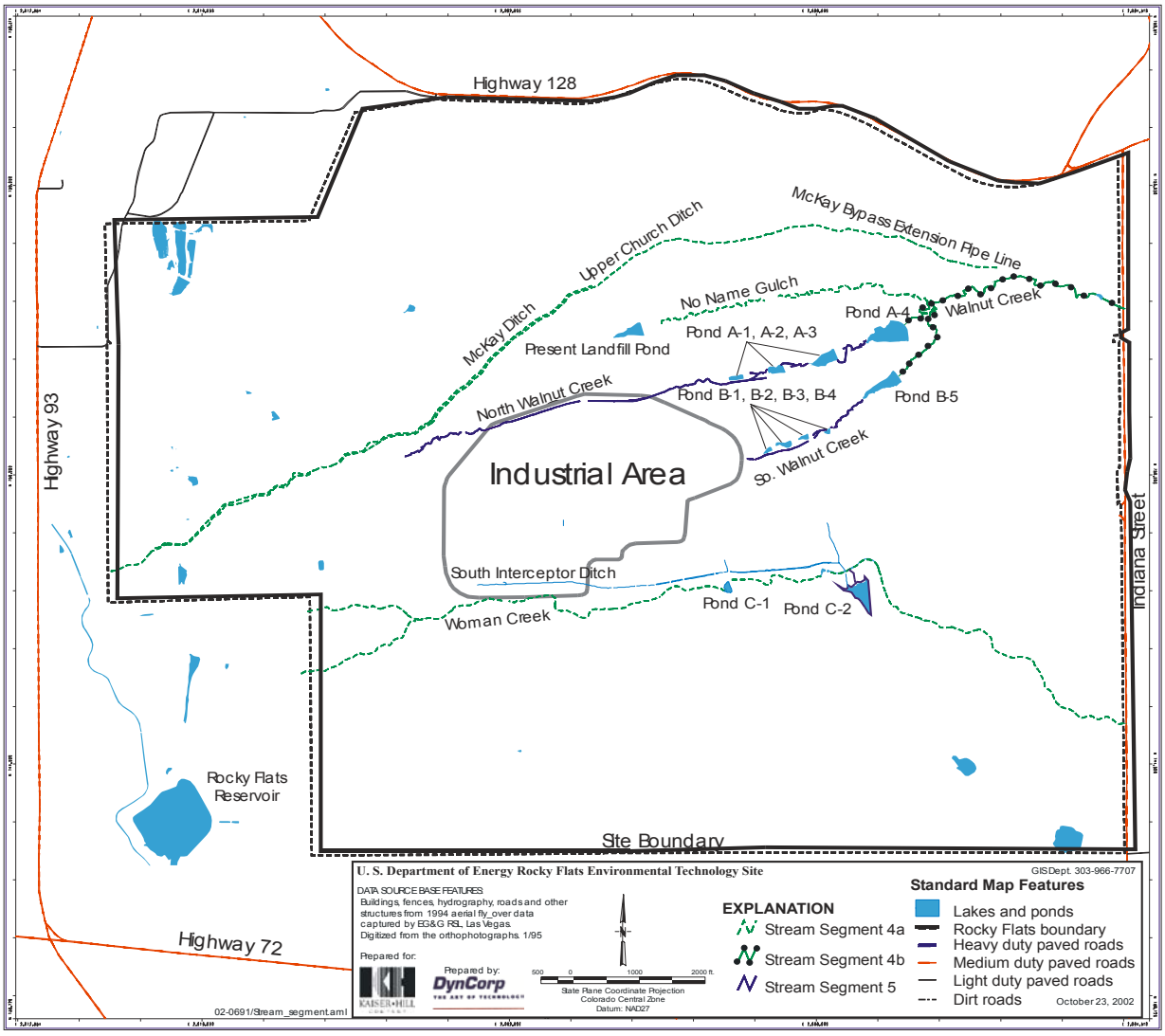

Figure 2. Sketch of Stream Segments 4a/4b and 5.

3.0 Ground Water

3.1 Basis of Action Levels

At the time RFCA was signed, three ground water classifications applied at RFETS: Domestic Use Quality, Agricultural Use Quality, and Surface Water Protection. Effective March 2, 1997, the WQCC removed the domestic use and agricultural use classifications since direct use of ground water will be prevented at the Site through institutional controls. Surface water protection was retained as the only use classification for ground water at RFETS. During the period of active remediation; ground water action levels will apply and must be protective of surface water standards and quality as well as of ecological resources. Since no other human exposure to on-site ground water is foreseen, ground water action levels are based on surface water and ecological protection. This framework for ground water action levels assumes that all contaminated ground water emerges to surface water before leaving the RFETS.

3.2 Action Level Strategy

The strategy for ground water is intended to prevent contamination of surface water by applying MCLs as ground water action levels. MCLs have been established by EPA for many chemical contaminants and represent the maximum permissible level of a contaminant in drinking water. MCLs are listed at 40 CFR 141.61 and 141.62. Where an MCL for a particular contaminant is lacking, the residential ground water ingestion-based ~~P~~PRG value will apply. Ground water action levels are based on a two-tier approach. Tier I action levels consist of near-source action levels for accelerated cleanups, and Tier II are action levels **that** ~~which~~ are protective of surface water.

A. Tier I
   1. Action levels consist of 100 x MCLs (see Table 2).
   2. Designed to identify high concentration ground water "sources" that should be addressed through accelerated actions.

B. Tier II
   1. Action levels consist of MCLs (see Table 2).
   2. Designed to prevent surface water from exceeding surface water standards/action levels by triggering ground water management actions when necessary.
   3. Situations where ground water is contaminating or could contaminate surface water at levels above surface water standards/action levels will trigger a Tier II action.
   4. Tier II Action Levels are to be measured in designated wells **as identified**

~~Tier II wells have been selected by all parties from the existing monitoring network where practical. New wells have been proposed where apparent gaps exist. Designated Tier II wells are listed in Table 3.~~

a. Tier II wells are either currently uncontaminated or contaminated at levels less than MCLs. In general, Tier II wells are located between the down gradient edge of each plume and the surface water towards which the plume is most directly migrating.

b. If the proposed new wells are shown to be contaminated or if additional plume information dictates, new or alternate wells will need to be chosen.

3.3 Action Determinations

A. Tier I

1. If Tier I action levels are exceeded, an evaluation is required to determine if remedial or management action is necessary to prevent surface water from exceeding standards. If this evaluation determines that action is necessary, the type and location of the action will be delineated and implemented as an accelerated action. This evaluation may include a trend analysis based on existing data. Accelerated action priority will be given to plumes showing no significant decreasing trend in ground water contaminant concentrations over 2 years.

2. Additional ground water that does not exceed the Tier I action levels may still need to be remediated or managed through accelerated actions or CAD/RODS to protect surface water quality or ecological resources and/or prevent action level exceedances at Tier II wells (e.g., lower-level, but fast-moving contamination). The plume areas to be remediated and the cleanup levels or management techniques utilized will be determined on a case-by-case basis.

B. Tier II

1. If concentrations in a Tier II well exceed MCLs during a regular sampling event, as specified in the Integrated Monitoring Plan, monthly sampling in that well will be required. Three consecutive monthly samples showing contaminant concentrations greater than MCLs will trigger an evaluation. This will require a ground water remedial action, if modeling, which considers mass balancing and flux calculations and multiple source contributions, predicts that surface water action levels will be exceeded in surface water. These actions will be determined on a case-by-case basis and will be designed to treat, contain, manage, or mitigate the contaminant

plume. ~~Such actions will be incorporated into the ER Ranking (RFCA Attachment 4) in which they will be given weight according to measured or predicted impacts to surface water.~~

2. Ground water contaminated at levels above ground water action levels currently exists at several locations. Each of these situations will be addressed according to appropriate decision documents.

3. Any contamination in ground water resulting from releases from a unit at RFETS subject to RCRA interim status requirements will be addressed through this ALF and through remedial actions rather than through RCRA closure (see Attachment 10 to RFCA, RCRA Closure for Interim Status Units). This would include ground water containing nitrates from the Solar Ponds plume. Addressing the nitrates through this framework will allow these waters to be managed in a more cost-effective and flexible manner.

C. Other Considerations

1. Efficient, cost-effective, and feasible actions that are taken to remediate or manage contaminated ground water may not necessarily be taken at the leading edge of plumes; but rather at a location within the plume. Factors contributing to this situation could include technical impracticability at the plume edge, topographic or ecologic**al** problems at the plume edge, etc. This situation may result in a portion of a plume that will not be remediated or managed. This plume portion may cause exceedance of MCLs at Tier II wells or exceedance of surface water standards/action levels. When an up-gradient ground water action is taken that results in this situation, DOE and its subcontractor may request relief from the ground water and/or surface water standards. CDPHE and EPA will evaluate the request and may grant temporary relief or a change to the standards/action levels for a specific area. Soil or subsurface soil source removals will not be considered as the sole justification for the changed standard/action levels. In addition, such changes will be determined such that surface water use classifications are not jeopardized and surface water quality does not exceed standards at POCs.

2. Ground water plumes that can be shown to be stationary and do not therefore present a risk to surface water, regardless of their contaminant levels, will not require remediation or management. They will require continued monitoring to demonstrate that they remain stationary.

3. Where background levels exceed action levels, more frequent sampling and remedial actions will not be triggered. For those constituents where

high background levels exist, a modified action level considering background will be developed.

4. ~~When groundwater action levels for volatile organic compounds (VOCs) are exceeded in the vicinity of buildings designated for reuse, human-health risks due to inhalation of indoor accumulations of those VOCs must be considered. When such an exceedance occurs in the Industrial Use Area, the evaluation which is triggered must include a comparison against the appropriate PPRGs which have been calculated for office worker exposure to indoor air.~~

3.4 Ground Water Monitoring Network

A. Ground water monitoring will be consistent with the Integrated Monitoring Plan, which will be reviewed on an annual basis.

B. All ground water monitoring data as well as changes in hydrologic conditions and exceedances of ground water action levels will be reported quarterly and summarized annually to all parties.

C. If quarterly reporting shows that previously uncontaminated wells are contaminated above ground water action levels, the sampling frequency will be increased to monthly. Three consecutive monthly samples showing exceedances will trigger an evaluation to determine if a remedial or management action is necessary. If three consecutive monthly samples then show no exceedances, the sampling frequency will revert back to the frequency specified in the Integrated Monitoring Plan.

D. All ground water plumes that exceed ground water action levels must continue to be monitored until the need for institutional controls is mitigated.

E. All ground water remedies, as well as some soil remedies, will require ground water performance monitoring. The amount, frequency, and location of any performance monitoring will be based on the type of remedy implemented and will be determined on a case-by-case basis within decision documents. The remedy should also consider that surface water quality will be acceptable for all uses after active remediation.

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4.0 ~~Subsurface Soil~~ Non-Radionuclide Contaminated Soils

4.1 ~~Basis for~~ Action Levels and Basis

A. Action levels are the concentrations in soils of non-radioactive contamination listed in Table 3 Soil Action Levels.

B. Action levels have been calculated to be protective of:

1. Human exposure appropriate for wildlife refuge worker land use:

a. By protecting the wildlife refuge worker to a lifetime excess cancer risk of $1x10^{-5}$ (These action levels also equate to an excess lifetime cancer risk to a hypothetical rural resident of less than $1x10^{-4}$) and;

b. By providing that the concentration of contaminants in surface soil achieve a Hazard Index (HI) of 1 for a wildlife refuge worker; and

2. Ecological resources.

C. These action levels result in a lifetime excess cancer risk of $1x10^{-5}$ to a wildlife refuge worker.

4.2 Action Determinations

The Site will undergo characterization in accordance with the Industrial Area Sampling and Analysis Plan (IA SAP) or the Buffer Zone SAP (BZ SAP). Non-radionuclide soil contamination will be evaluated for Action Determinations as described in A-H, below.

A. Actions will be determined on a case-by-case basis and may include any or a combination of removal, treatment, institutional controls, or engineering controls. (For volatile organic compounds, where VOC contamination levels approach free product concentrations, such as at IHSS 118.1, a combination of contaminated soil source removal and groundwater treatment may be selected as the appropriate accelerated action.)

B. Where characterization data indicate that soil contamination exceeds action levels to a depth of 6 inches, DOE will propose to remove the

contamination, unless this is not appropriate considering Sections 4.3 and 4.4.

C. Where soil contamination is identified below 6 inches in depth, the Soil Risk Screen, Figure 3, will be used to evaluate the potential risk of exposure and the need for further action.

D. Additional soil contamination may need to be remediated or managed to protect surface water quality in accordance with Section 2.4.

E. Where soil contamination exceeds the ecological action levels in Table 3, *Soil Action Levels*, DOE will consider the target species and the exposure unit for that species, and the location, areal extent, and concentration of contamination in evaluating and determining appropriate accelerated actions necessary to protect ecological resources. Accelerated actions to protect ecological resources may include the use of biota barriers, soil removal or target species management actions.

F. Following accelerated actions soils with residual contamination will be evaluated in the RFI-RI/CMS-FS and an appropriate response action will be documented in the CAD/ROD. It is anticipated that institutional controls or a combination of institutional controls and engineered controls will generally be used to manage these lower risk sites.

G. Where a concrete slab or asphalt, concrete or other man-made material at existing surface grade covers the soil surface, the basis for action will be determined with the material removed.

H. Soils beneath "below-grade" structures, e.g., basements, valve vaults, pits, etc., will be addressed through the application of the Soil Risk Screen in Figure 3.

4.3 Factors to be considered for all Action Determinations

A. Actions will be developed in an integrated manner with other actions being taken;

B. Actions will be consistent with best management practices; and

C. Remediation and/or management actions will be implemented to protect ecological resources where those actions can be implemented without damaging other ecological resources.

4.4 Isolated Data Points

A. Single geographically isolated data points of contamination greater than action levels will be evaluated using the data aggregation methodology outlined in the IA SAP and the BZ SAP, and action will be taken as warranted.

B. These single data points will not trigger a source removal, remedial, or management action, in the absence of the source evaluation.

SUBSTANTIALLY REVISED – REDLINE VERSION NOT CREATED

5.0 ~~Surface Soil~~ Soils Contaminated with Radioactive Materials

5.1 Basis for Action Levels:

A. Action levels are the concentrations of radioactive materials contamination in soils that have been selected from levels provided in *Results of the Interagency Review of Radionuclide Soil Action Levels,* September 30, 2002.

B. Action level concentrations result in a calculated annual radiation dose, under conditions of unrestricted land use, that does not exceed the annual dose limits in the Colorado Radiation Control Regulations, *Radiological Criteria for License Termination*, 6 CCR 1007-1 RH 4.61, which is a potentially relevant and appropriate requirement for any final remedy.

C. Action levels have been calculated to be protective of:

1. human exposure appropriate for a wildlife refuge worker land use;

2. rural resident land use, in the event the land use is not restricted to a Wildlife Refuge; and

3. ecological resources (action levels for radioactive contamination that are protective of human health are lower than concentrations of radioactive contamination that are protective of ecological resources).

5.2 Action Levels

A. Radioactive soil contamination exceeding action levels in Table 3, Soil Action Levels, will be evaluated for Action Determinations as described in 5.3, below. These action levels result in a lifetime excess cancer risk of $1x10^{-5}$ to a wildlife refuge worker. (These action levels also equate to an excess lifetime cancer risk to a hypothetical rural resident of less than $1x10^{-4}$ and result in a radiation dose of less than 25 mrem/year to either a wildlife refuge worker or a rural resident).

B. The total risk from multiple radionuclides will be accounted for by the sum-of-ratios method.

5.3 Action Determinations

The Site will undergo characterization in accordance with the Industrial Area Sampling and Analysis Plan (IA SAP) or the Buffer Zone SAP (BZ SAP). Actions will be determined on a case-by-case basis and may include any or a combination of removal, treatment, institutional controls, or engineering-controls consistent with A–G, below.

A. Where characterization data show that plutonium and/or americium soil contamination originating at the surface exceeds the action level, DOE will remove sufficient radionuclide contamination to at least meet the action level within the top 3 feet. If plutonium and/or americium soil contamination greater than the action level extends below 3 feet in depth, the Soil Risk Screen, Figure 3, will be used to evaluate the potential risk of exposure and the need for further action.

B. Where characterization data show that uranium soil contamination originating at the surface exceeds the action level, DOE will remove sufficient contamination to at least meet the action level within the top 6 inches. If uranium soil contamination greater than the action level extends below 6 inches in depth, the Soil Risk Screen, Figure 3, will be used to evaluate the potential risk of exposure and the need for further action.

C. Where plutonium and/or americium soil contamination greater than the action level is present at a depth of less than 3 feet, but did not originate at the surface, soil contamination will be removed unless, after consultation with the Lead Regulatory Agency, it is decided that the concentration and aerial extent is such that removal is not warranted.

D. Plutonium and/or americium soil contamination found in the 3-6 foot depth interval will be addressed as follows:

1. If during characterization of soils between three and six feet total plutonium/americium contamination is found at an activity concentration of greater than 3nCi/g, "step out" sampling will be performed to determine the areal extent of contamination. Based upon the results of the "step out" sampling, a removal action may be triggered depending on the areal extent of the contamination. If plutonium/americium soil contamination is found in the 3-6 foot depth

interval that exceeds 3 nCi/g, and the areal extent of the contamination is found to be greater than 80m^2, it will be removed to an activity concentration less than 3 nCi/g.

2. If plutonium/americium soil contamination is found in the 3-6 foot depth interval at activity concentrations greater than 10 nCi/g, it will be removed to an activity concentration less than 3 nCi/g without additional sampling to determine the areal extent.

3. The principle of ALARA will be applied such that if incidental additional excavation will result in significant additional source removal, (such as reducing the contamination level from 3nCi/g to 1 nCi/g or even background) then the additional removal will occur. Application of ALARA will be most appropriate when the extent of contamination is defined by a sharp concentration gradient; areas of diffuse contamination may not benefit from ALARA principals. If extensive contamination is detected from 1nCi/g – 3nCi/g, then the RFCA Parties and the communities will use the consultative process to evaluate human health and environmental risks and implement actions as appropriate.

4. Original Process Waste Lines (OPWLs) and associated radionuclide contaminated soils are addressed through the OPWL characterization approach described in Attachment 14.

E. Additional soil contamination may need to be remediated or managed to protect surface water quality in accordance with Section 2.4.

F. Following accelerated actions soils with residual contamination will be evaluated in the RFI-RI/CMS-FS and an appropriate response action will be documented in the CAD/ROD. It is anticipated that institutional controls or a combination of institutional controls and engineered controls will generally be used to manage these lower risk sites.

G. Where a concrete slab or asphalt, concrete or other man-made material at existing surface grade covers the soil surface, the basis for action will be determined as if the material had been removed.

H. Factors to be considered for all Action Determinations:

1. Actions will be developed in an integrated manner with other actions being taken;

2. Actions will be consistent with best management practices;

3. **Actions may be accomplished by means of an interim or final action; and**

4. **Remediation and/or management actions will be implemented to protect ecological resources where those actions can be implemented without damaging other ecological resources.**

I. Isolated Data Points

1. **Single geographically isolated data points of contamination greater than the action levels will be evaluated using the data aggregation methodology outlined in the IA SAP and the BZ SAP, and action will be taken as warranted.**

2. **These single data points will not trigger a source removal, remedial, or management action, in the absence of the source evaluation.**